

Governor's Upper Yellowstone River Task Force
Meeting Summary
March 25, 2003
Yellowstone Inn
Meeting began at 7:00 p.m.

I. Introductions

Members Present:

John Bailey, Chair
Dave Haug, Vice Chair
Roy Aserlind

Andy Dana
Bob Wiltshire
Jerry O'Hair

Ed Schilling
Rod Siring
Jim Woodhull

Ken Britton, USFS Ex-Officio
Laurence Siroky, DNRC Ex-Officio

Allan Steinle, Corps Ex-Officio
Joel Tohtz, FWP Ex-Officio

Others Present:

Liz Galli-Noble, Coordinator
Kelly Wade, Secretary
Duncan Patten, TAC Chair
Peter Ismert
Danielle Gyskiewicz
Mike Gilbert

Karl Biastoch
Jim Durgan
Jim Barrett
Andy Hansen
Bruce Maxwell
Scott Compton

Tom Pick
Daryl Smith
Tom Hallin
George Jordan
Stan Todd
Monica Brelsford

Bill Moser
Steve Caldwell

II. Prior Meeting Minutes

Jerry O'Hair moved to approve the February 25, 2003 minutes as written. Dave Haug seconded the motion. The motion passed unanimously.

III. Financial Updates

EXPENDED GRANTS			
Grant Name	Completed	Amount	Study Component
DNRC Watershed Planning Assistance Grant	6/30/99	2,100.00	Physical Features Inventory
DNRC HB223 Grant	7/30/99	10,000.00	Aerial photography
DNRC Riparian/Wetlands Educational Grant	6/30/00	960.99	<i>Hydrologic Response to the 1988 Fires Workshop</i>
DEQ 319 Grant (1 st)	9/30/00	40,000.00	Coordinator position
DNRC Watershed Planning Assistance Grant	1/31/01	10,000.00	Watershed Land Use Study
DEQ Start-Up Grant	6/26/01	49,138.00	Coordinator position, Admin secretary, additional cross-sections, operating expenses.
DNRC HB223	10/1/01	6,500.00	Riparian Trend Analysis
BLM Funding	10/26/01	10,000.00	Wildlife Study
DEQ 319 Grant (2 nd)	3/21/02	58,000.00	Coordinator position
DEQ 319 Grant (3 rd)	9/30/02	44,000.00	Coordinator position
EPA RGI Grant	12/20/02	30,000.00	Geomorphology study
CURRENT GRANTS			
Grant Name	Amount	Spent	Remaining Balance
DNRC RDGP Grant (expires 7/03)	299,940.00	288,621.63	11,318.37
DEQ 319 Grant (4 th) (expires 3/04)	122,200.00	44,201.19	77,998.81

IV. Research Presentation #9. Historic Watershed Use for the Upper Yellowstone River

1. Meeting Format and Introductions

John Bailey: Before I introduce Duncan Patten, who will introduce the researchers, I want to review the formal presentation process that the Task Force has adopted. We ask that there be no questions or interruptions while the researchers are giving their presentation. There will be no questions until they are done. Once they are done, we will take questions; questions from the Task Force will be taken first, and then we allow people from the public to ask questions. I want to stress that your questions can only be related to the research that is presented. If questions are asked by either the Task Force or the public that relate to other things, as Chair, I have been asked to cut them off. After we have completed the question and answer session, we will then go into the general discussion session. Again, the Task Force will be asked to make comments first, and then the public will be asked to comment. We've used this format in all the studies that have been given to date, and it has worked quite well. But please remember, on that first part, to the researchers, you can only ask questions relating to their research. Now I'm going to introduce Dr. Duncan Patten, who heads the Technical Advisory Committee, and he will introduce the researchers.

Duncan Patten: Tonight we have Montana State University presenting their results of the Historic Land Use Assessment. We will have Monica Brelsford, Dr. Andy Hansen, and Dr. Bruce Maxwell doing the presentation—I guess Andy will introduce the study, Monica will do the presentation, and Andy and Bruce will be available to answer questions. I am glad to see this presentation because early on in the development of the studies, no one wanted to look at land use in the flood plain; and then as we continued to discuss the studies, land use seemed to become a critical need. This MSU study is an offshoot of what now has become the "current" land use study led by Tom Pick for the NRCS. We were very fortunate to have Andy Hansen's team step in and help fill this data gap for us. With that, I will introduce Dr. Andy Hansen.

2. Research Presentation #9. Historic Watershed Use for the Upper Yellowstone River. See attachment *Historic Watershed Land Use Assessment* PowerPoint presentation.

Note: This presentation was videotaped and may be viewed upon request. Contact the Task Force Coordinator if you wish to borrow the videotape.

3. Question and Answer Session

John Bailey: Questions from the Task Force?

Andy Dana: I do think that your study is an interesting study, and I'm concerned a bit about some of the assumptions. I'll just raise some of the questions that I have, or concerns I have. First is the assumption that houses are inhabited, or not inhabited. For example, on our ranch in 1948 we had plus or minus three houses; in 1979, we had six houses and two were abandoned; and in 1998 we had five houses and two were abandoned. Those abandoned houses, some of them were denning areas for foxes or skunks or marmots. So I'm concerned about the assumptions of your "zones of influence" around structures that you may see, and how you control for that.

Monica Brelsford: When I went out driving to look at—to ground truth—these houses, if the house was abandoned I deleted it off my data sheet. Now, I can't go back in time and look at those things. All I can do is guess from what I see in 1998, and go back in time and say, "well, you know, this house looks like it moved, because it got destroyed and somebody built a new house," or something to that effect. I did the best I could, and yes, there are some concerns there. But as far as zone of influence, I've only shown it for the 1998 data, and there was a portion of those houses that I could not go see in person (that is, to see if there were two houses, or an abandoned house). The other thing I used to help me out was, when I got to an area that had a "No Trespassing" sign and I didn't cross it, there were usually mailboxes there, and I went off the mailboxes. I said, okay, in my photo I have six houses mapped, yet there are only four mailboxes. I mean, that's all I could do, but I did try and address it.

Andy Dana: I guess another assumption is that, even for the inhabited houses that had mailboxes, is there any way to check for second homes, which may have a much lower zone of influence?

Andy Hansen: I think the key point here, in this study, is that it would have involved going into the basement of the county tax assessor to try to figure out, as much as possible, about these homes. That wasn't the intention of the study. The intention was pretty much as presented here, to simply document as best we could from aerial photos and ground visits, how many homes that there were, or where they were, and how that changed through time. When we put up this zone of influence, it's important to point out that we're simply offering that as a way of helping us think about how might this information be meaningful. Whether every home is occupied or not, or whether it's 50 meters or two miles, this study does not allow us to be exact on what in fact are the influences and how far out do they radiate. We simply offer this as a way of helping you to think about this home question.

Andy Dana: I guess I offer the sad fact that there are second homes, a lot of second homes, as a way to think about thinking about it.

Andy Hansen: Sure, we're well aware of that. Would you admit that that is way beyond what we ever said we would do?

Andy Dana: I did have a specific question about the chart where you said, "this looks very complicated but isn't necessarily" [Slide #15]. I understand, I think, what was happening there, but I noticed that there were, for example, increases in Grasslands and decreases in Agriculture, but I didn't see them adding up to a zero figure. In other words, it didn't zero sum out. Why is that?

Monica Brelsford: It did zero out. We can go back to it and I will explain it. I did not have a circular function for the Conifer type, so as land went out, that became a positive. So, I didn't have a circular function there.

Andy Dana: Just looking at the net, down seven percent Riparian, down Shrubland 15 percent, down 12.5 percent...

Monica Brelsford: Within these land use types, each land use type has a different amount of acreage. And if the Riparian vegetation goes down due to conversion to Agriculture, within that subset there was a net loss of seven percent.

Andy Dana: Within which subset?

Monica Brelsford: Within the Riparian land use type. I wrestled with this a lot, and as a whole, in the Paradise Valley, Riparian changes one percent. It's declining one percent of the total. But if we take Riparian lands, and we ask how much of the Riparian land is changing, it was decreasing by about seven percent. So it depends on if you're looking at it as a total of all the land use area, or if you're looking at it as the total of the Riparian. Did I explain that?

John Bailey: Doesn't this chart need to show acres, not percentage? Because we don't know what the percentages are. We need acres, because we don't know how many acres we're comparing.

Bruce Maxwell: Monica has graphs that do show acreage [see additional Slides #30, 31, 32, 33]. Andy and I suggested that she use the percentages [Slide #15], just because it puts everything kind of on an equal. You can get a sense for how these net changes are; here versus here versus here.

Andy Dana: I'd still look at that and say we've lost a lot of land. If we're losing a net of 1.5 percent of Agricultural land, where does that go? If we're losing seven percent, I understand that you meant the type...

Monica Brelsford: We have a positive down here going into Forest, of plus 18 percent.

Andy Dana: That's minus 15 percent.

Monica Brelsford: That's from Shrubland to Forest. So, if Shrubland Juniper is converting into these Low-density and High-density Conifers, as some of it is decreasing you also have to count up these things that I didn't do circular, cyclic functions on, which is Forest. Which is, we have a plus 18 going out here, and a plus one into the Forest category, we also have a plus one and a plus 0.5 going into the Disturbed. So, if we add up these things, we'll have a net of the net and the balance I think is minus 23.5 percent, which is what these out ones add up to. Do you understand what I mean now?

Andy Dana: No.

Monica Brelsford: Okay. Does anybody?

John Bailey: Your acres aren't the same.

Andy Dana: Just one additional question. How many of the 18 homes in the flood plain are new, as opposed to from 1948 or 1979? And how many of those... What's that percentage in the flood plain?

Monica Brelsford: I didn't figure that number yet, that would be a good number to figure. I didn't directly compare the 1948s and who was in the flood plain, although on my aerial photo [Slides #21 and 22] the red triangles mean 1998 and the green dots mean 1948. So, I guess we can look at that in an aerial photo, just as a curiosity, yes.

Andy Dana: And also, what does 18 percent represent in a percentage of total homes?

Monica Brelsford: Eighteen out of 957 homes, not very many. No, it's a small percentage.

Andy Dana: One last clarification question. When you talk about homes being located within the 100-year flood plain, is that for the Yellowstone River or does that include the tributaries? Because I noticed that you had tributary houses, near Mill, Mission, and Pine Creeks.

Monica Brelsford: When I was looking at the land use types and what changed, I included those secondary streams in the Riparian land use type. However, when I was looking at the 100-year flood plain, I only looked at it for the Yellowstone River, which is what was available from the USGS.

Andy Hansen: If I could just comment about the 18 homes. We basically were interested from the question of bank stabilization point of view; how many homes are clearly at risk of flooding from the definition of being within the 100-year flood plain. And finding just 18 out of 950 or so, indicated that there were not, proportionally, many homes. I think there is an important message to that—and that's one of the reasons that we highlighted it here—when there are homes in the flood plain, then clearly, heavy-duty measures are needed to keep those homes from being flooded. It appears that there still are lots of options for the Upper Yellowstone; in that, much of the flood plain does not have homes. There are big implications for the future about questions of how many homes, how many additional homes, are wanted in the flood plain, and what does that mean for how you then have to manage the river. That's kind of the main point that is being raised here.

Dave Haug: I've got another question on the influence of homes. When you have structures associated with your home like a road across your property, you shouldn't really have any influence across there, or an adjoining stream, or different types of vegetation. I was wondering if there wouldn't be a way of eliminating some of the effects of the homes on those areas; that would show if they clearly are or aren't being influenced by them.

Andy Hansen: There's a fair amount of literature that addresses that; for example, weed spread is related to road distribution, and wildlife mortalities are related. So again, we can talk in general about some of these ecological consequences of homes, and of the yards, and of the roads and all, in this study. This is what Bruce and I study. But to be clear, we don't have definitive data that addresses what in fact are those real effects and how far do they radiate out.

Bruce Maxwell: There's a lot of variability, and that's a problem, you're right. There are some situations where you're going to have something, and other situations where you're not. We're kind of going out there with some average and saying: 100 meters to 6,000 meters; that's a big variability, but that's kind of the state of the art, to tell you the truth. It could be somewhere in that range. It depends. If you're talking about agricultural production, you've got *Kosha* that tumbles across, and it'll go five miles before it hits pavement and it's still dumping seed all the way. It's a trade off here as to how we average; what area is to what? I guess ultimately, if we had the detailed photos and you could outline those areas that you actually can see are having some impact, that would be great, but that would take lots and lots of time.

Andy Hansen: The big message here is that there wasn't much change in actual distribution of agricultural lands and of natural habitats. None of us knew that ahead of time, but that was the finding. The big message is that the big change was in the number of homes. There are still many fewer homes than say in the Gallatin Valley or some other places along the Yellowstone. This rate of increase in 15 years, on a percentage basis, is probably as much as most of the fastest growing places we've studied. So, a good message is that's one of the changes that has happened, and maybe it then leads us to more interesting end questions like: Well, so what? What are some of the ecological impacts? What are some of the possible impacts on the river? What are some of the benefits in terms of local tax base? or What are the costs of services of those additional homes? This finding of more homes is really just the start, I think.

Dave Haug: One more thing. When you went from one type of Cropland—say from Crop to Hay to Grassland, or vice versa—did you cross reference those with NRCS maps? Because Hayland to Grassland a lot of times, if it's played out Hayland, it could look really similar from the air.

Monica Brelsford: I was looking at aerial photos so I did my best. Cropland was designated as land that was irrigated, where I could see ditches running across. Sometimes they were cut right before the photo, sometimes they hadn't been cut, so some looked greener than others. Some were square, some were irregularly shaped; those were some of the keys that I had to go on. As far as changing from Crop to Hay—because of the time of year, it was September—in some areas you could clearly see the second growth alfalfa, and in some areas you could see distinct lines made by combines; they could be defined as Cropland. As we're looking at aerial photos, we have to realize that there is going to be some margin of error, and that maybe that Hayland had been just hayed and everything pulled off, so it did look like Dryland, and that is a possibility.

Bruce Maxwell: That's one of the ones that you can't put much stock in those numbers because that is a problem. You've got a September photo, and to tell the difference between Hay and Grass is pretty tough. That's one of the ones that's really pretty hard to capture.

Roy Aserlind: If you go back to your slide [Slide #15] that you had the conversions of Riparian to Grassland, I just need some clarification. For instance, Grassland, 89 percent stayed the same from 1948 to 1998. Now, in just about every instance, does the change, more or less, total the difference from 100 percent? In other words, there should be 11 percent change in Grassland.

Andy Hansen: We're missing one. There's always some rounding error.

Roy Aserlind: And then there's the one percent increase. So you could pretty much account for just about 100 percent of the transitions from what to what. Is that a correct statement?

Andy Hansen: So the idea here is that, for the Riparian type for example, this is stuff that was Riparian in 1948. So basically for each acre, for each polygon Monica asked, "Did it stay the same?" And 87 percent of Riparian stayed Riparian, and then Monica asked, "If it changed, what did it change to?" So again for the Riparian type, 87 percent stayed the same, 11 percent went to Agriculture—so now we're up to 98 percent—and then one percent went to Grassland; so that's 99 percent. We rounded the numbers, so it's really all of it. So basically the idea is that it's a simple thing to say what was it before, what is it now, and those numbers all add up to 100 percent. So the percentages are quite straightforward to understand.

Roy Aserlind: Well that clarifies my question. Thank you.

Jerry O'Hair: I guess I need a little clarification. You've classified some land as being Shrubland, and then later you said there was no change if it became houses in Shrubland. Is that correct?

Monica Brelsford: According to the classification scheme that I used from Tom Pick's NRCS watershed study, I didn't classify rural houses as separate polygons. I didn't have the ability to go around every house and then to analyze polygons that are one acre in size. So instead of having a polygon with little chunks for houses taken out of it, I had polygons that spanned the whole area, and it was Shrubland. Even though a new house would come in to it, it was still Shrubland. I didn't pull out those small changes.

Bruce Maxwell: Monica treated houses as "points" that didn't have any area. That's why when we came back to do the area-of-influence analysis, we had to assign some area back to the houses. Because it's so detailed—you get to this problem of: is this an inhabited house, is this an outbuilding, and checking those kinds of things—Monica had to just call it a point. Then, when she came back to it later, she had to address: Where are these points? and Can we say anything about how much space they represent? We're trying to bring up this idea that there are different perspectives. If you're concerned about where houses are in the river bottom, because they could get flooded, then using a point is okay; you just want to know: Are they in that river bottom? and Are they exposed to flooding? If you want to know: Is a house having some kind of an ecological impact? Then you have to deal with this messy idea of the things that go along with a house, and could they have some impact. If you want to talk about a house as being a place that's an introduction point for weeds, and if it's going to effect your wheat field next door, then you've got a different set of considerations. That's where we are at with trying to come back to the house and give it some area. But as it exists, the way Monica dealt with it, houses can sit in a cover type that's a polygon that is just a Shrubland or Grassland type. They are just points within it, the houses don't take up any space for analysis purposes.

Jerry O'Hair: But doesn't land use change when you take Shrubland and add housing? Doesn't that change land use?

Bruce Maxwell: We're pretty certain it does, and that's why we tried to answer the question: What is the area of influence of a house? That's why we tried to give you some ideas for how you might assign some space that a house takes up. It has a "real" space (the yard and the actual square footage of the house), and then it has an "effective" space.

John Bailey: You made the statement that you are measuring houses from the flood plain. And then you said that the only houses in the flood plain are in the braided reach. But if you look at the other reaches you have, it's almost impossible to get a house into the flood plain. I think you need to be careful about how you make that statement. In Park County over the years, there has been a lot of talk about distance from rivers, and the braided reaches have a big flood plain; but in these entrenched areas, I think you'd probably find more houses right on the bank, but you're not indicating that. The visual thing, I have been at more meetings, more heated meetings in this county, about that subject. You've got that data, but you're not presenting it.

Andy Hansen: We talked a lot about how to present this house data, and how to analyze it. When I asked for your suggestions in doing that, at the beginning, it was always aimed at the houses from a flood control point of view; you guided us there. It seems logical that it's those homes that are actually in the flood plain that are considerations, when it comes to flood management, and it's also those that are up on banks that could erode, leading houses to be jeopardized by the flooding. So exactly how to analyze the data to represent both those that are down low enough to be in the flood plain and those that are on banks that are at risk, how to do that we'd like some advice on.

John Bailey: I think it's also visual. If you float through the braided stretches, you see fewer houses than you do in the entrenched stretches, where the houses are sitting on the bank right along the river. And that is probably the issue—the visual issue—that is more controversial. I haven't been to many meetings that are trying to get all the houses out of the flood plain, it's mostly trying to move them further back from the riverbank. But if you float the river, and you look, you'll see the houses in the entrenched reaches, you won't see so many in the braided reaches. One of the reasons is because there are trees in front. That has been what a lot of those meetings are about. You've got that information, but your statement is—or at least it comes across that—houses are encroaching in the braided reaches, but not in the others. From the visual point of view, I believe they're encroaching in those other areas more so.

Andy Hansen: I would just come back to the fact that we're basically presenting fairly raw data about home locations and we're hoping that you all will interpret them in ways that are meaningful for the issues you're dealing with. If we gave the impression that we are stressing that these are the **only** important ways to think about homes, that's not our intention at all. Again, that's way beyond what the study is about. I think the comments that you are making already indicate that just these pictures of where the homes are, are prompting a lot of thinking about these issues. And I would suggest that they are very valuable from that point of view.

Bruce Maxwell: I just want to make a quick comment. One of the things that Monica did show [Slide #20] was home site distance from the flood plain. She showed that graph, and it was interesting because it had this blip that's within about 200 meters, then it's low, and then it comes up again. It's almost like, once you get out 3,000 meters or so, then you start picking up the houses again. So it is kind of interesting where they are distributed.

John Bailey: But does that start from the 100-year flood line?

Monica Brelsford: Yes, the first column on the graph was the 18 homes within the 100-year flood plain, and then the distance out went from the polygon that represented the 100-year flood plain out. So I lumped the distance out 100 meters, and there were 120 houses in that area.

John Bailey: So I would ask, in the braided stretch, where you have a big flood plain, I don't think you're giving us a fair comparison. Because in the entrenched you're going basically from the banks of the river back, because that is where the 100-year flood plain is. But in the braided areas, the 100-year flood plain may be a quarter mile from the overbank. I'm just saying that I think your data is not equal, if people are thinking from the visual point of view.

Bruce Maxwell: Actually, we have it broken down as I recall by the different stretches. So you could ask, on that same histogram [Slide 20], you could see how the distribution changed between those. I don't recall what it looked like, but certainly the report will have those pieces all broken out.

Andy Hansen: It sounds like you're suggesting that we try to map distance from active channel. Distribution of homes as a function of distance from active channel. Would that be helpful from your point of view?

Duncan Patten: The active channel is constantly moving, so you'd just have to base it on your one flow pattern. You can't give them data on people's perception of where a house sits, relative to the river. All you can do is give them data on whether or not it is in the 100-year flood plain, or how far is it from the 100-year flood plain. If you say it's x amount from the river channel, then you basically are ignoring the type of flood plain. And I'm not sure that from a geomorphic perspective, that that is good data. Perception, that's something else, and that's not what you're being asked to do. I want to look back at your diagram here again [Slide 15]. I hate to say it, but I sat and looked at this, and I'm converting area and I'm thinking area of Riparian, I'm thinking area of Agriculture, and you've got a net loss for Riparian. And if you look at the pluses and minuses going in and out of Riparian, it comes out to a net minus seven. But the five percent coming from Agriculture is five percent of Agriculture that's going to Riparian, which is a huge amount. So if you add up those numbers, they come to minus seven, but not if the five is actually Ag. You're pluses and minuses in those little dashed boxes need to be reexamined.

Bruce Maxwell: Yes, we've got to go from the acres to get those, rather than using percents.

Duncan Patten: I hate to point that out, but I kept looking at that, and thinking, "that ain't so". But 87 percent is good.

Andy Hansen: So just to make it clear here, these kinds of diagrams get complicated based on whether it is percent of area or actual acreage. If any of you have any doubt of the validity of the analysis, I would love for you to come up to the lab and we will walk you through all of this. So, leave here with no doubt that there is no error in the analysis; it's just that it's hard to present. Actually, my druthers would have been to only present the percentages just as a way of getting this started. Forget the little boxes. When you do your taxes, which

you're probably doing now, there's many different ways to represent a given set of data, and I'm sure you can defend all of them.

Laurence Siroky: You described the 100 meters for the homes away from the flood plain polygon, but did you mean the boundary of the 100-year flood plain, the outside boundary?

Monica Brelsford: It seems to me that you are confusing two charts. I have homes located 100 meters from the riparian 100-year flood plain [Slide #20]. I also have a separate slide in which I created the zone of influence around a house that was also a hundred meters [Slide #27].

Laurence Siroky: Okay, I understand that. But you have 118 homes located within 100 meters of the flood plain, so what's the flood plain? Is it the line, the outside boundary?

Monica Brelsford: Yes, it's also the boundary of the 100-year flood plain as it's delineated.

Laurence Siroky: You earlier said polygon, and I don't think you meant that.

Monica Brelsford: Oh, okay. Part of the 100-year flood plain has not yet been developed for this area, that I was able to use in this analysis. So what I had to use was Mike Merigliano's riparian area that he had. So I didn't have information for a portion of the study area for the 100-year flood plain as it currently is. It's being developed now.

Laurence Siroky: The maps are out now, so are you going to update that?

Monica Brelsford: Yes, I can update it for my final report, definitely.

John Bailey: I'll take questions from the public now also.

Bill Moser: Could you go into "Disturbed", as to what that cover type entails? Does that include the roads that have been built in Park County since 1948?

Monica Brelsford: I could not create polygons around every road; so no, roads are not included. What is included in Disturbed is ground that looks denuded of vegetation, which includes gravel pits. There is also an area around Corwin Springs in which there was a lot of digging and excavating that now has homes on it, that in 1979 just looked like disturbed ground. So that part goes into the Disturbed type. So basically it is anything in the aerial photo that looks like it has no vegetation on it.

Bill Moser: The two questions I'd like to ask are: How many structures in Livingston are in the flood plain? and, How many in the study area are in the flood plain? Because that's what generated the Task Force in the first place. So the question I would ask is: how difficult would it be to come up with some guesstimates of how many structures are imperiled if the river doesn't meander?

Andy Hansen: So I suppose the most cost effective way to approach that would be to focus on the 100-year flood plain, the full length of the river in the study area using this kind of approach. It's probably pretty doable, but to give you a dollar figure? I don't know. Probably somewhere between \$20,000 and \$40,000 to do it using these same methods for that particular flood plain over the whole study area.

Bill Moser: I got this report this afternoon and I went and looked at the area (π , "r" squared) and it looks like if you use a one-kilometer radius around the house or a six-kilometer radius, it looks like you're kind of looking at maybe approximately one-square mile effected per house. Which, based on this internet data, Park County has 2,802 square miles and there's 8,247 housing units in Park County as of the year 2000. So, we would have to have all of Gallatin County and some more land, and have all the houses also there, just to meet the criteria of having an impact of one kilometer around the house. That just doesn't seem to be reasonable. And the six kilometers, I don't know where people could ever come up with something like that. Maybe you could comment.

Andy Hansen: You bet. So, in the first case, the donuts around houses tend to overlap. If you have two houses close together, then they together are, their radii are overlapping. So the higher the density, the less, generally, the smaller percentage of new ground that's occupied by one house. There's lots of overlap. In terms of the six kilometers, that comes right from yours truly, in that over in the Gallatin Valley we did a detailed statistical analysis of one measure of ecological response, and that is reproductive levels in migratory birds. We found that rates of reproduction were significantly influenced in a negative direction by proximity to a house, and that affect held up to a six-kilometer distance from the house. Now, what might be the mechanism? Well, it turns out that cowbirds are a really nice example, in that of course you know that cowbirds lay their eggs in nests of other bird species; and in doing so, the cowbird chicks actually sometimes toss out the host chicks from the nest. So they in fact have a big affect on the host reproduction. Those cowbirds feed at birdfeeders, they feed in compost piles and manure piles, and so forth that are associated with having hobby livestock around a house. Those birds can easily fly six to seven kilometers and radio telemetry studies have documented exactly that. In fact, it is quite real, and there's very strong data to support it; for that particular ecological response, that a distance of six kilometers is in fact the case. Now, how far do pets radiate from a house? That study hasn't been done in this area. It's probably way less than six kilometers. How far might certain weed species radiate? Bruce could talk about individual types of weeds, some of which would not radiate at all, and others that would spread seed for a long distance. So you get the idea that this whole thing about zone of influence around a house, it varies with each of the particular precise responses that you're interested in.

Andy Dana: I guess what I'm concerned about is, or maybe you can clarify, the zone of influence is not necessarily a bad thing. For example, deer thrive in suburbia and so it is great for deer to have zones of influence. It might be lousy for mountain lions, or maybe it's good for mountain lions. I guess I'm concerned about how that zone of influence concept is used, and what use it is really? Because you have to assign some sort of a value judgment to whether a zone of influence is good or it's bad.

Andy Hansen: Yes, and that, again, you've just pointed out what I think is the key take home message, that, when you say a house is there, then the next question is, so what? What are the benefits, what are the downsides?

John Bailey: We're moving into discussion. We were doing it a little earlier than scheduled. If we want to go there, that's fine, but are there any more questions specific to the research?

Andy Dana: That's pretty close to research.

Bill Moser: On page 7 of your summary report, I think, you show your Juniper, and for some reason the Juniper disappeared in 1979.

Monica Brelsford: Well, I put my value in the wrong spot. I will have to redo that one, I apologize. It's actually over there in the Sage group, it's the dark bar on top of Sage.

Jerry O'Hair: A year ago we had a large fire in the valley up there. How does that change land classification, or does it?

Monica Brelsford: When I was mapping with the black-and-white photos, I could see that some areas had burned, but they were already regrowing. I didn't classify in that area as far as the Fridley Fire. I guess as I would map it, it would be like a clearcut. It would be an area that was burned, and there is a classification on that satellite land use map, that's one of their classifications: Burned Forest. I didn't come across that area, I came across clearcuts and selective cuts.

Jerry O'Hair: Some of that area is going to change for a long time. It's not going to be regrowth timber, it's going to change classifications.

Bruce Maxwell: So do you suspect it will go to Grassland or Shrubs or something?

Jerry O'Hair: Weeds.

4. General Discussion Session

John Bailey: We will now move into the discussion session of our meeting. Any comments from the Task Force?

Dave Haug: I guess just to make a point of comment. I'd say on the charts that you have, that really I didn't see as much change as I really expected to see. I would have really expected a lot more change in Riparian, which is probably the biggest number at seven percent; but really when most of it's going to Agriculture, a lot of that is real similar. I guess out of the whole presentation, the biggest point coming back to me is the home influence, which is something I hadn't really thought about before. I expected a lot more change from one year to the other.

John Bailey: Ed, will you explain to me the setback that the County has for houses. Where is it from?

Ed Schilling: From the river.

John Bailey: Active channel?

Ed Schilling: Not from the flood plain.

John Bailey: And it's 100 feet?

Ed Schilling: Yes, but it's not from the edge of the flood flow, the 100-year flood plain, it's actually from the river.

John Bailey: The reason I was asking the questions earlier is that in Park County there is a setback of 100 feet from the channel. Obviously in the braided section that's moving a lot. So one year you might be able to build a house, in another one, you can't. That's the reason that I think the data here is important to show, because the Commissioners are making judgments based on that. You've got the data, and it's a data set that you can make available that goes along with something they're doing.

Ed Schilling: That wouldn't change with the river channel as long as it's not within the flood plain, as far as building a home.

John Bailey: What did you just say?

Ed Schilling: You were talking about as the river changed, as the channel changed, how that 100 feet would change; but it actually wouldn't change as long as it was within the 100-year flood plain.

John Bailey: Are you saying that you don't allow houses in the 100-year flood plain?

Ed Schilling: We discourage that.

John Bailey: Thank you. So, it does change.

Bruce Maxwell: Does that mean you're using the distance from the river, that line drawn on a map? So if you get the NRIS river data, for example, that 100 feet will be from that map, which is probably a 1998 mapped river? So, in 2003, if the river moves over 100 feet, you could lose the house, but you still were legal by the County?

Ed Schilling: That would be correct.

Bruce Maxwell: What I'm asking this for is, what we can do is, we can shift some of our data to represent from the river, the distance from the river. So we'd be using the same data that the county uses, based on their assessment of where the houses can go.

Duncan Patten: The river when?

Bruce Maxwell: We could also ask that, to see where the river is moving.

John Bailey: Now, let me just add one more thing. I believe the way they measure is not horizontal, but instead it's however the land goes. So if you're on a big cliff, with a little angle, that's a 100 feet up the hill, you can be right on the top. Correct?

Ed Schilling: I don't know.

John Bailey: I believe that is so. The reason I believe that is that my wife once worked on a case trying to determine what 50 feet back was; because there is a public easement of 50 feet up at Loch Leven. And no one knew if it was horizontal, but it actually was determined that it was by measuring up the land. I'm not sure the County knows, but I bring it up because we have so much of this steep stuff and I know of at least one instance where it was measured by just taping the land. The County may have an issue here that they have never thought about. But if you are using aerial photos, this is really very difficult.

Bruce Maxwell: This is the one additional thing that we could do with our data that seems like it might help answer some of these questions. You mentioned the view from the river. With a fairly detailed digital elevation map, there is a way for us to calculate the view distances from any point. We could do a series of points along what we have as being the river from our data, so you could do some of that to get a sense for, in these braided sections, what the average is for 100 points if you choose at random, versus another section. We could do some of that, if that would be useful.

Jerry O'Hair: I'm wondering if that is what we are supposed to be dealing with, is viewscape? I think that's plum out of the Task Force's charter. I guess I don't really understand that, that's really getting into land use, when you're getting into viewscales and that sort of thing.

John Bailey: I doubt I could get consensus on that by the Task Force, but I bring it up because the County has passed a regulation that it is a 100-foot thing. This data at least is one way to show that, if it's being used or not. If you look at the Socio-Economic study, there is a lot of use of the river. I only bring it up in the discussion because I think it is important, and I think there are people in the audience that spend most of their lives on that subject. Will we actually take action on it? I doubt that. But I don't know why, when we're talking about this data set, it seems like it could help people somewhat have quantified information on it; whether we use it in our recommendations or not. And they were sort of asking about ways that this information could be used.

Dave Haug: I guess I'd have to agree with Jerry in that, for the purposes we're really going for, and a lot of ours is related to riprap and different influences like that, if a house is out of the flood plain, even if it's right on top of the river, really there is no influence as far as riprap and changes to the river that's going to be made. I go along with looking more at the actual things that will impact the river. Is it a house in the flood plain, or is it a house up on a cliff?

Duncan Patten: Let me just quickly respond to that. Obviously, the closer you build a house to the river, the greater the potential is that you're going to build something to protect it. And if the concern of the Task Force is bank stabilization and modifying the channels and that, there's a greater potential for modifying the channels and creating bank stabilization and dikes and things like that if you build your houses closer to the river. So, how many houses are close to the river gives you some idea of what potential there is for future bank stabilization. Since there are only 18 houses in the 100-year flood plain, the potential is a lot lower than if there were 50. That's one way of looking at it, relative to what you think probably the goals and objectives of the Task Force are.

Dave Haug: But I mean if it's up on a cliff around a rock impoundment you have almost zero chance of needing riprap, versus a house built in the flood plain.

Duncan Patten: That's not in the 100-year flood plain.

John Bailey: Dave, then give me your opinion on the Jumping Rainbow house. When it was built, it was a long way back. When you fished the river you could barely see it. But they had to burn it down because it was

going to fall into the river. I mean, I think we can always find exceptions. I'm not trying to go there, just knowing what the County does, knowing meetings I've gone to, all of you have gone to, and if one of those meetings comes up, someone is going to come get this data and use it. I'm not suggesting that the Task Force, in our recommendations, is going to use it as a visual thing at all, but I certainly can see this data being used in a meeting in front of the Commissioners because you've been to the meetings where they were trying to get 300- and 600-foot setbacks.

Jerry O'Hair: I guess the point I'm trying to make is that you were talking about the homes that were built in the area of the river that was not braided, and that river doesn't change in that area, and you were talking about the view of these houses from the river. My concern is that we're a little out-of-line in the fact that we're talking a land use situation, rather than the actual river, which the Task Force is charged with. These homes are built in an area that is not on a braided river, so the classification of the river is not changing, or it hasn't changed there in a good many years, so I can't really think that we should be looking at that.

Andy Hansen: I'd like to just comment on this policy question—that focus on the 100-year flood plain—and I'll just point out what I suspect everybody already is thinking, but I'll just emphasize it. And that is that the whole Task Force is set up around this question of: Should the river be allowed to move around as it has done naturally, and appears to still be doing relatively naturally? This is based on our earlier presentation, the presentation a month ago or so. My team specifically looked at this house question, as Duncan indicated, because you know if there are houses, then there's going to be a big reason to do bank stabilization to protect those houses from flooding. So, it seems to me, a much bigger question for the next 20 years and the next 50 years is: To what extent can ag land be protected via riprap? There's a much bigger question, if there are 200 homes or 500 homes on the flood plain; can those be protected? So clearly, relative to Task Force recommendations, some clear thinking and discussion about recommendations for land use within the 100-year flood plain is extremely critical and relevant to this whole question of: How do you manage the banks of the river? If there is one single major take-home point from our analysis, it's that right now there are still lots of options because there are not too many homes; and if there's two or three or four or five times more homes, there's going to be fewer and fewer options. A group like this will have a lot more headaches if there are a lot more homes there. So it's just a matter of carefully thinking about the benefits of putting them there, versus a policy that would deal with that. I think that's really the core question from the bank stabilization point of view.

John Bailey: But that's with the reaches you studied. If you went from Pine Creek to town, then you'd find a lot of houses in the flood plain. So I think you need to be careful making the statement that there are only 18 houses presently in the flood plain and we don't have many problems.

Andy Dana: That was the point I was going to make, is that the Task Force has to be very careful because this is a really limited study area. Do we lose all of town, and there's been development in the Emigrant area, maybe that was sampled. But we do need to be careful not to extend this too far.

Tom Pick: I think it is really important to look at both the occurrence of homes within the flood plain as well as proximity to the channel; for two different reasons: one being the susceptibility to flooding, and the other being channel migration. They are two different issues, but they are both germane to the charge of the Task Force. I do think they are both important, and do merit looking at both ways.

John Bailey: I guess we're open for public comment also now.

Jim Barrett: I just want to speak to the issue of aesthetics. One of the studies that was done here had to do with the social and economic impacts. And a good portion of that dealt with people's perception of their experience on the river. I think a lot of the discussion, the entire Task Force discussion, has to do with economics. In that, some of you are protecting an economic interest, protecting property that has a value to it, protecting an important fishing area, spring creek, etc., that have economic ramifications to this community. Certainly the aesthetic experience of those who float the river for purposes other than fishing, or perhaps even if they are fishing, there's an impact if the river is lined with houses, and that certainly has an economic impact at some point. So I just wanted to make sure that we don't lose sight of the economic aspect of this. It's difficult, I'm not going to say it's not difficult to assess, but certainly there is an economic component there.

Tom Pick: I wanted to ask you if it would be possible, or if anyone has looked at, taking this information on the homes—which is very good, specific, highly-detailed information—and try to match that up with the new coverage that Jim Robinson and Chuck Dalby built for the structures [physical features inventory]? In terms of relating the land use, land cover/land use, and the locations of these points of these homes, to see if there are any relationships with where the structures are.

John Bailey: Structures in the river?

Tom Pick: In the river, and land cover/land use. The NRCS actually tried to do that to the greater watershed study, but it just did not support it; given the detail to which they are now trying to take those features [rip rap, barbs, jetties, dikes, etc.] and link them to the land coverage that we built. It was sort of comparing apples to oranges, and we didn't feel that it would be fair to do that. But the information that MSU has—which is highly detailed and very specific, and has been georectified—might work. To try to line that up, or overlay that, with the new coverage the Jim Robinson built; they didn't remap everything but they have the riprap, barbs, and most of the riverbank structures, and they modified the location to fit the actual better georeferenced product. I know that wasn't in your original charter, and I don't know if the Task Force asked you for that, but that's just a comment.

Andy Hansen: Well it would be great to talk afterwards about that. It seems to me that that would be a nice thing to do.

Ed Schilling: When the gentlemen looked at the 100-year flood plain, how long ago did they make that mark on the map, making a 100-year flood plain, and how accurate is that mark on the map?

Mike Gilbert: For the flood plain, mapping is based on 1999 aerial photography that was converted to topographic information in two-foot contours and four-foot contours. I believe the accuracy for the two-foot area is probably like a foot-and-a-half, plus or minus. Laurence, does that sound right?

Laurence Siroky: That's the overbank areas, in the channel they're actually surveyed, so they're much more accurate than that.

Mike Gilbert: Right, so the topographic information dovetails with all the cross-sectional data. They looked at different discharges and other data, and that's all based on 1999 data. That's currently being reviewed in Laurence's office by Karl Christians, I believe.

Liz Galli-Noble: You didn't actually use the floodplain maps for all of your mapping, did you? Didn't you use the riparian maps created by Dr. Merigliano in a limited area?

Monica Brelsford: We got the maps from off the web. We got the 100-year flood plain off the web, but they weren't all there. I used the 100-year flood plain that was available off the FTP site, but it did not cover the Mission Creek study area of my portion of the study. What I used in the Mission area was Mike Merigliano's riparian work.

Mike Gilbert: To clarify the mapping issue a bit: Monica used data from US Geological Survey Water Resources Division out of Helena. They mapped the areas from Carter's Bridge going back upstream. Mike Merigliano also did some preliminary floodplain mapping as they were related to his cottonwood recruitment study. The Corps of Engineers is responsible for the area from Carter's Bridge down to Mission Creek. We just released that data to the Montana DNRC. The floodplain administrator is reviewing that data. We are currently working towards merging the US Geological Survey data with the Corps of Engineers mapping. That will be done in very short order. Does that help?

John Bailey: And for anyone who is confused, the floodplain maps they're talking about are not available to the public; they have not been accepted anywhere yet and are still in a review process. Only certain people have seen them; they have not been released to the public.

Duncan Patten: I thought you were using standard USGS maps? Or are you using the ones we're producing?

Mike Gilbert: Project specific mapping for this project.

Duncan Patten: They used the maps from this project?

Mike Gilbert: Yes, US Geological Survey, from Chuck Parrett and Steve Holnbeck.

Duncan Patten: There is a standard 100-year flood plain you could also get.

Mike Gilbert: I think that's FEMA data; I think that's pretty old though.

Laurence Siroky: With regard to the FEMA mapping, the only detailed mapping was done in the Livingston area, and the rest is all approximated.

Then I just want to clarify that the DNRC is going to be holding public meetings. We have talked with Park County and Steve Holnbeck (USGS) about holding those public meetings in May; to have public review of those draft floodplain maps. They are in draft form now. We'll review them to make sure that things look reasonable enough to take to the public to have them look at it. So our next step is to have a public meeting, and then the step after that would be a formal administrative rules hearing. That's how we adopt the map, and then the County has six months to adopt those as part of an ordinance. So that's the floodplain process in Montana.

Andy Hansen: We would love to use the latest and greatest. What would you all recommend? We're probably going to be wrapping up here in the next month. Can we get the maps, even before they are released to the public? So that we can do the analysis with the best data.

Liz Galli-Noble: They are on the FTP site, just call me tomorrow. There's no problem.

John Bailey: Other discussion?

Bill Moser: This doesn't necessarily cover tonight's presentation, but it is, I think, a discussion. The Livingston Library has a volume by Charles Fort called *The Book of the Damned* and it's available to anybody that wants to check it out. It's a book on what is science and what is not science. And one of the things Charles Fort points out is—when you have somebody go outside and look at birds, and they see three birds, and they say, "I saw three birds"—that's not science. But when you say, "I saw 3,000 bird calls per hectare", that's science. What I am trying to get to is, back starting with the first presentation, we had information on soil migration in tons. I went home and I calculated what these tons were. And I think if the public—because ultimately the taxpayers of Montana and the taxpayers of the United States funded everything that has gone on here—if you could say that "on a daily basis during high water, 80 dump truck loads of soil is migrating down the Yellowstone River", then the public has a feel for what this 2,000 tons, or whatever it is they said, is actually in physical terms. It's something we can relate to. What I would hope is that somebody on the Task Force, before all this is over, will make a motion that none of these studies get their payment until there's parentheses after these various quantifications that puts stuff into English. Where we have acres, and not hectares. And where we get in the final reports, we get something that the public can relate to easily and beneficially.

Duncan Patten: Let me respond to that. We have asked the researchers to do science. We've also asked them and they are expected to publish in peer review journals. There are standards for the metrics that are used in publication. We could create a table, a conversion table, or something like that, that would go with these; but I would expect these reports to be scientific reports. If we want to create an interpretive report, that's another task, but that's not what these people were asked to do. If they want to put something in parentheses, that's fine, but most journals no longer accept parentheses in English units. I don't disagree with you, but it's not what these groups were asked to do; and if the Task Force does want something in what I would call "normal American terms", that's a different story. We'd all be thinking metric if we didn't have a certain president about 20 years ago, but that's beside the point.

John Bailey: We're discussing this land use project tonight, and I think you're moving into a much broader thing. On April 29th (our next research presentation), you might want to bring it up, because it has something

to do with what they are going to be talking about. But I think you're off subject now, Bill, for what we're talking about tonight.

Other discussion tonight? If not, I thank you all very much. We're adjourned.

VI. Other Business

Next Task Force meetings:

Tuesday, April 8th, 2003, Recommendation Process Meeting
Location: City/County Courthouse (basement)

Tuesday, April 29th, 2003, Geomorphology Study
Location: Yellowstone Inn

V. The meeting was adjourned at 9:00 p.m.